



Armed Forces College of Medicine AFCM



Innate Immunity (Part 1)

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Immunology**

Intended learning objectives (ILOs) of Introduction to Immunology



By the end of this lecture the student will be able to:

- 1. Describe functions and components of innate immunity***
- 2. Outline functions of 1ry & 2ry lymphoid organs***
- 3. Compare characters of innate immunity to those of adaptive immunity.***

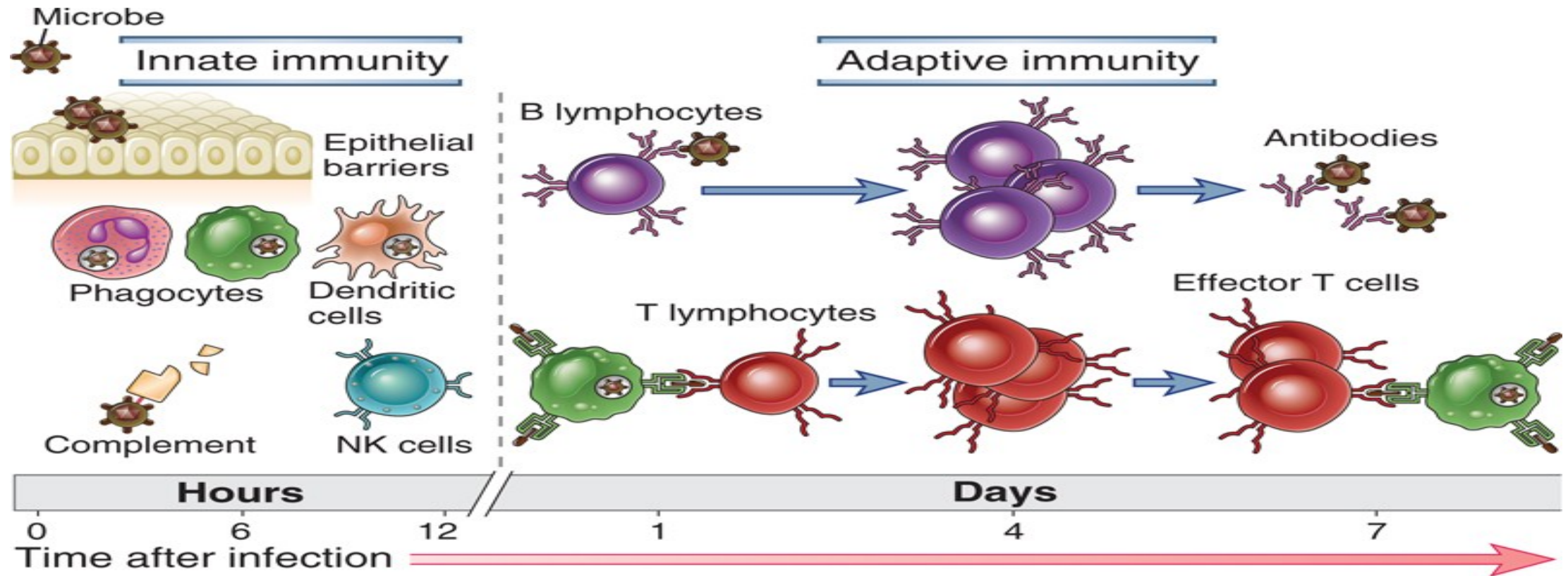
Types Of Immunity

A) Innate (Natural)

Immunity

1) **1st line** of defense → mediates initial protection against infection

2) **Activates adaptive immune response**



Components & Reactions of Innate Immunity

Mechanical & Chemical barriers

Normal Microbial flora

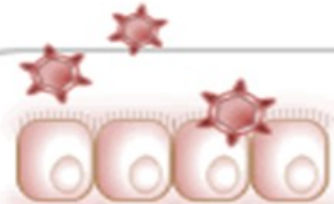
Phagocytes & Phagocytosis

Inflammation & Inflammatory cells involved in allergy

Circulating effector proteins

Innate lymphoid cells (NK cells)

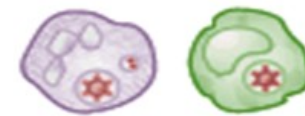
Innate Immunity



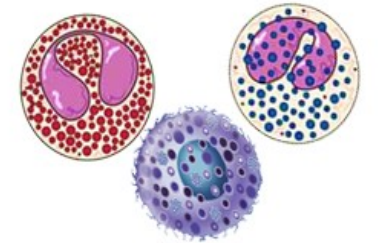
Mechanical & Chemical barriers



Flora



Phagocytes



Inflammatory cells in allergy



Effector proteins



NK cells

Hours

0

6

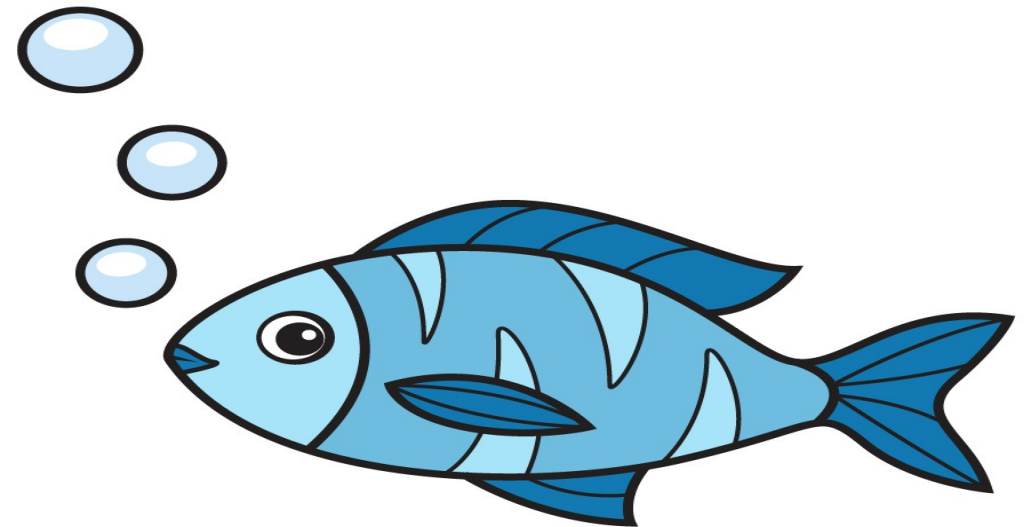
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I) Mechanical barriers

الحواجز الميكانيكية

A) Mechanical barriers

- Skin
- Mucus
- Cilia

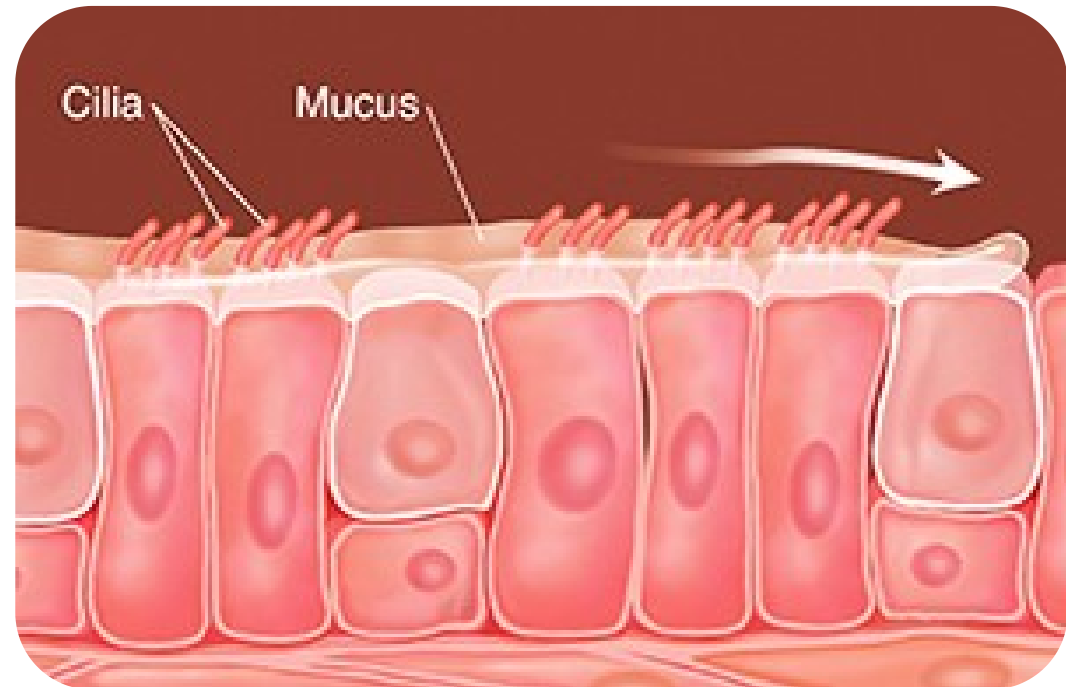
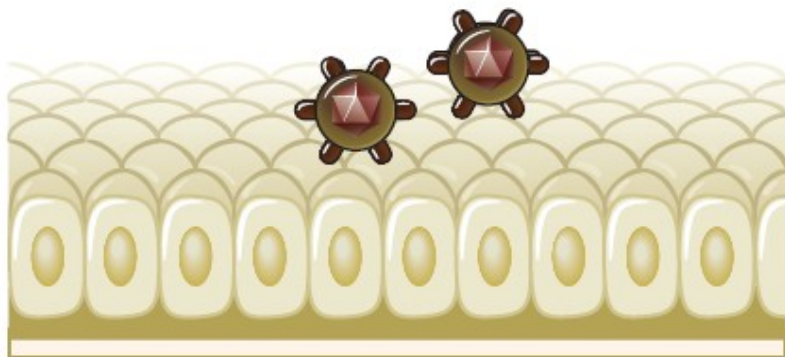


I) Mechanical & Chemical barriers

A) Mechanical barriers

- **Intact skin & epithelium of Respiratory Tract and Gastrointestinal tract**
- **Sticky mucus covering respiratory tract (RT)** → Traps inhaled organisms
- **Cilia** → Sweep organisms in mucus

Mechanical barrier
to infection



I) Mechanical & Chemical barriers

A) Mechanical barriers

- Skin
- Mucus
- Cilia

B) Chemical barriers

- Acids
- Lysosymes **(ALD)**
- Defensins

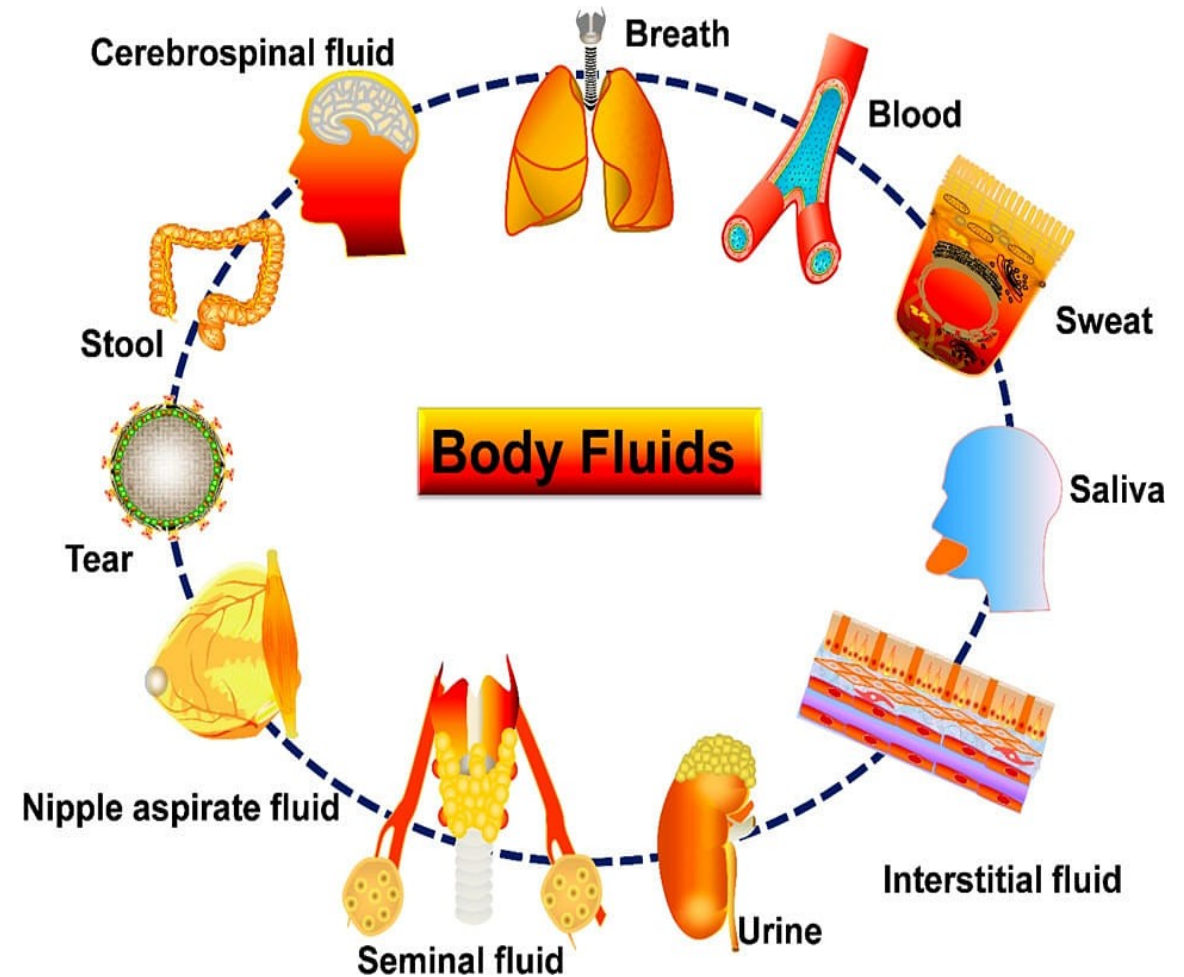


B) Chemical barriers



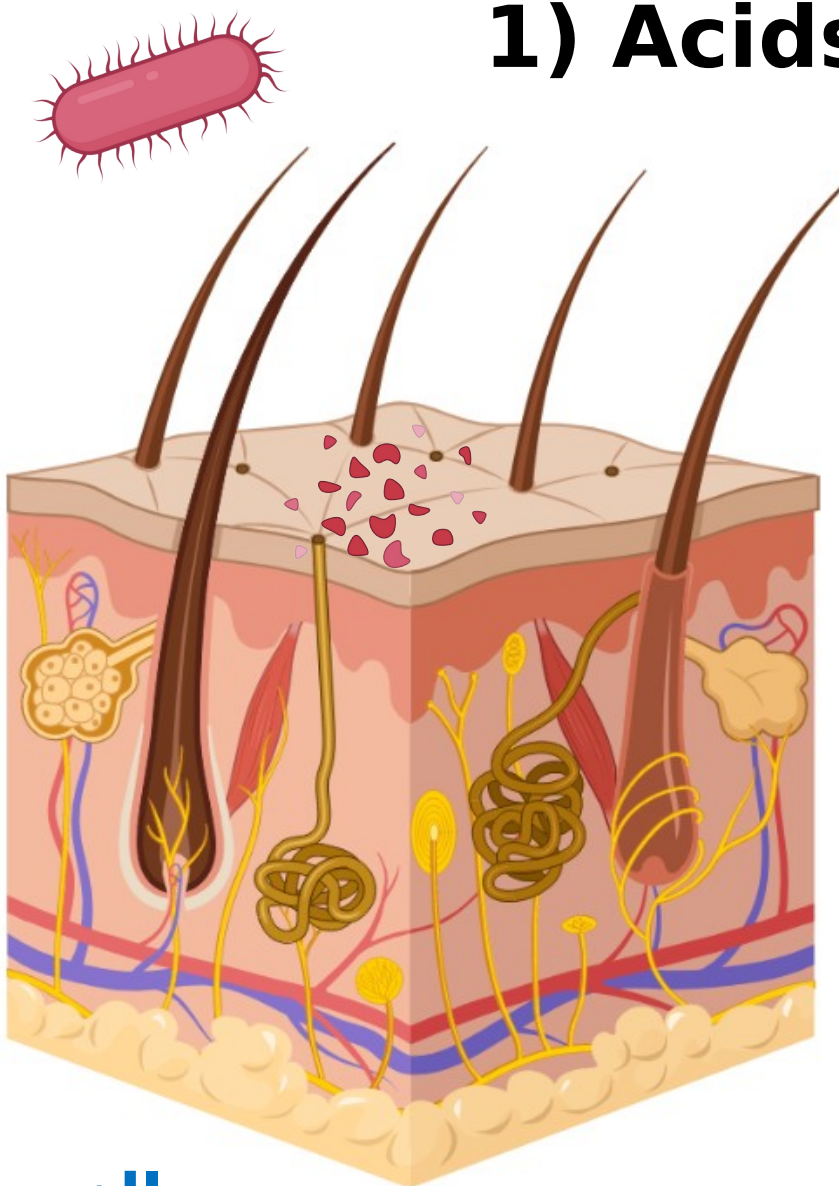
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Microbicidal in body fluids



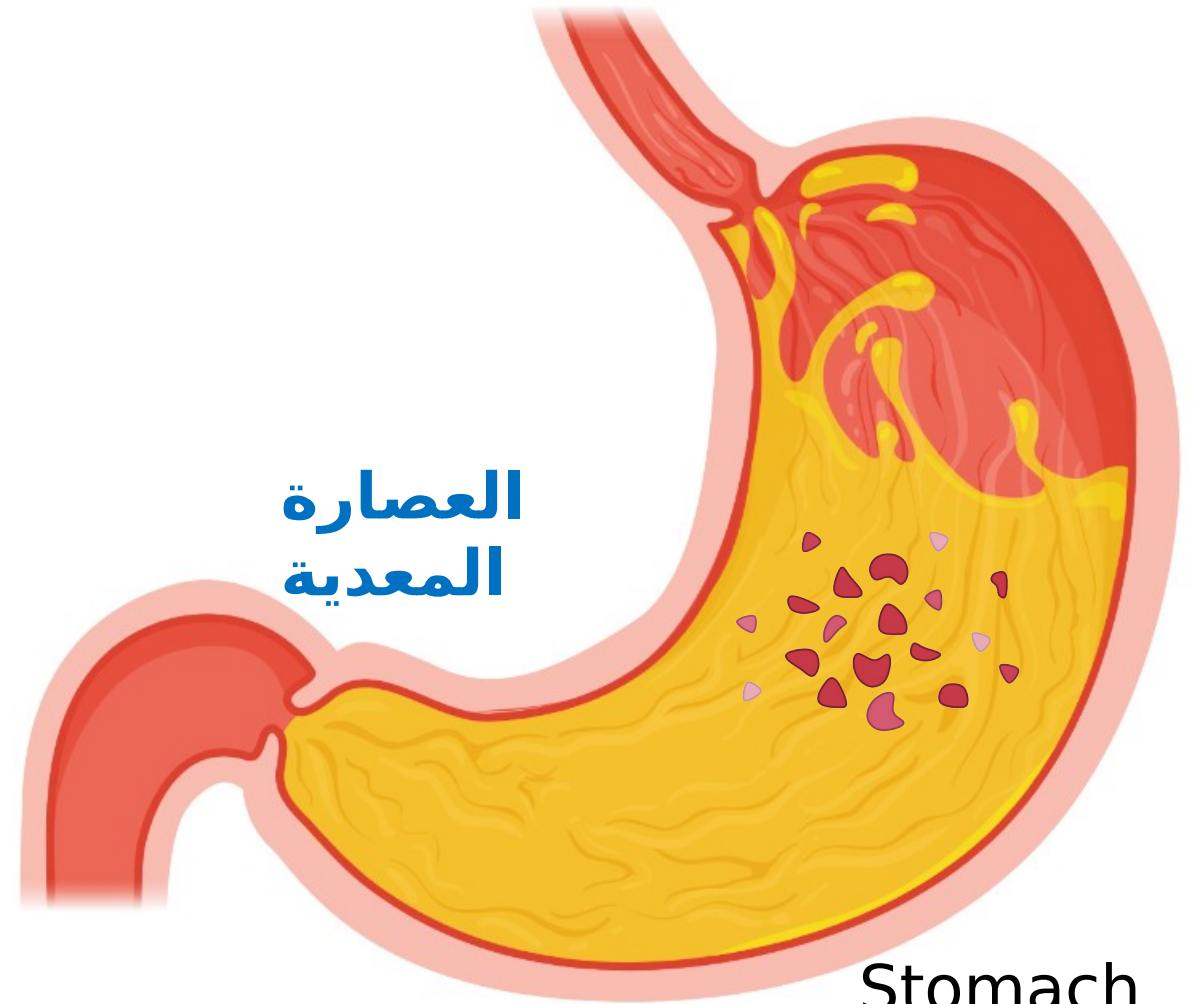
B) Chemical barriers

1) Acids (low pH)



الغدد
الدهنية

الغدد



العصارة
المعدية

Stomach

I) Mechanical & Chemical barriers

B) Chemical barriers

Kill microbes (cidal) or $\ominus$ their growth

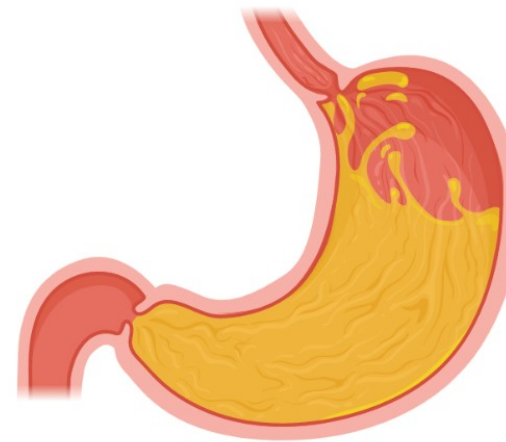
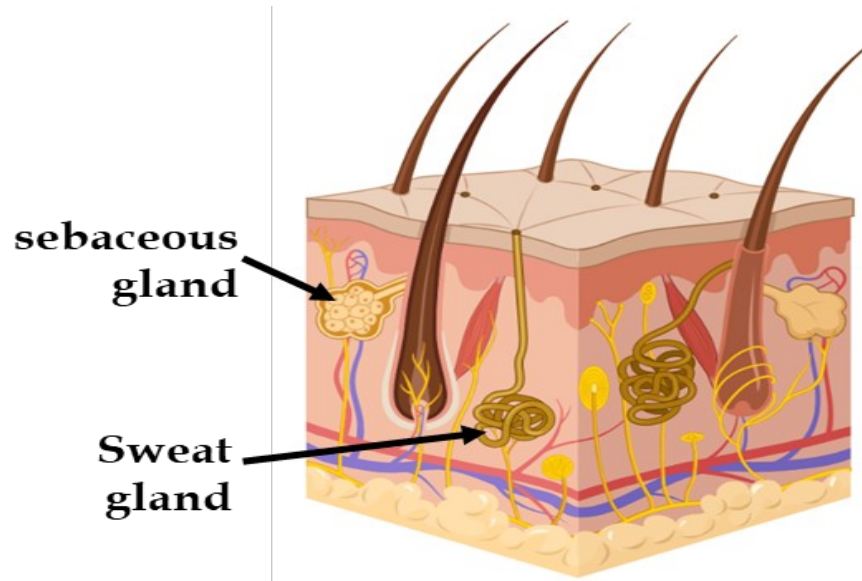
1) Acids (low pH)

Fatty & lactic acids

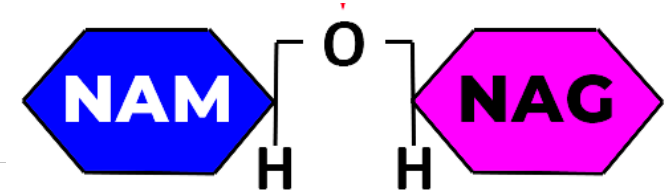
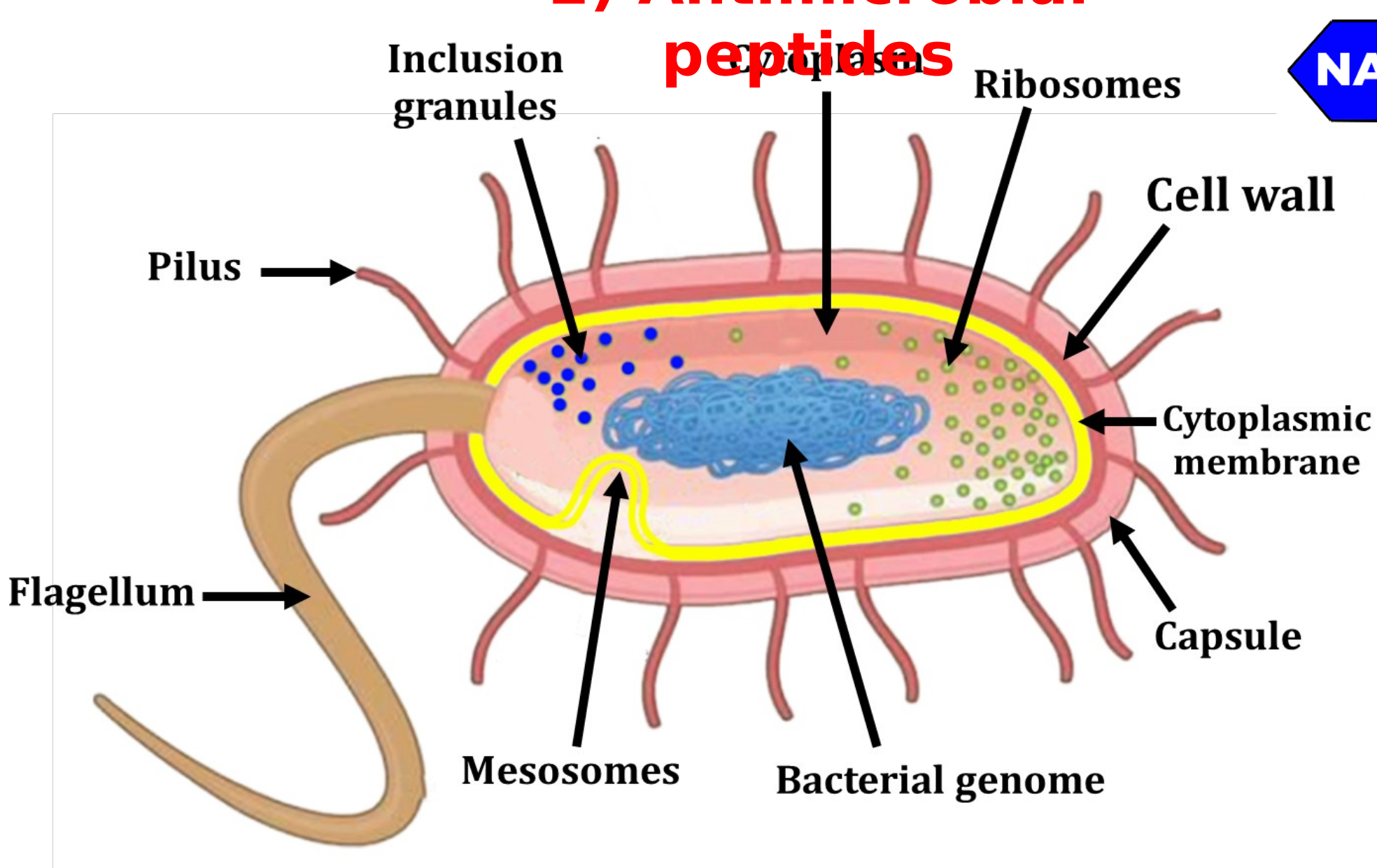
HCl

in sweat & sebaceous secretions

in gastric juice

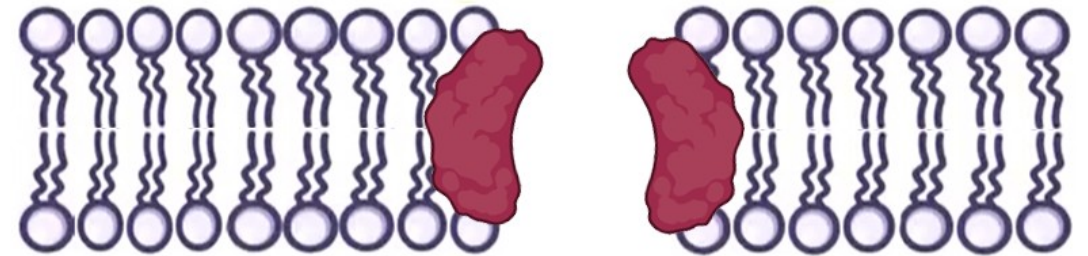
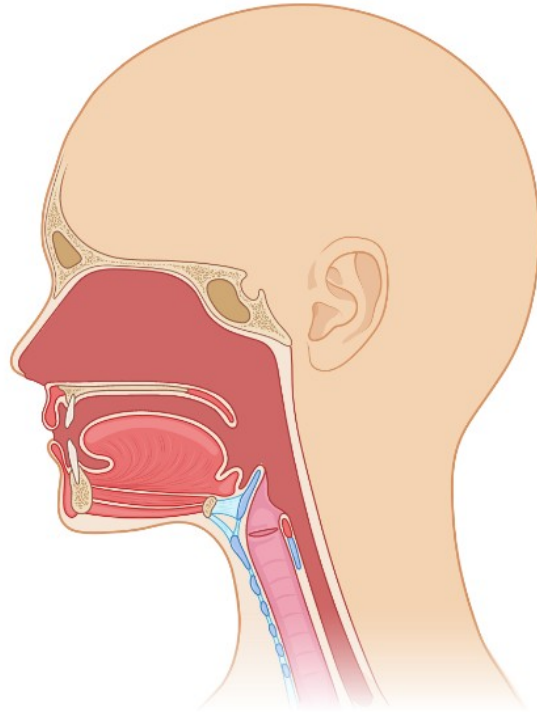
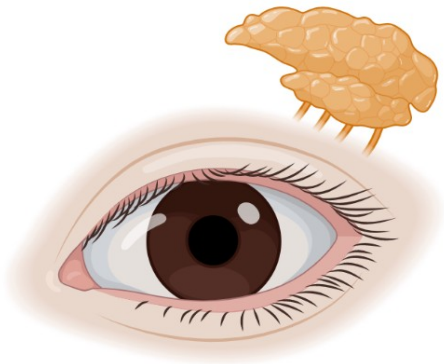


2) Antimicrobial peptides

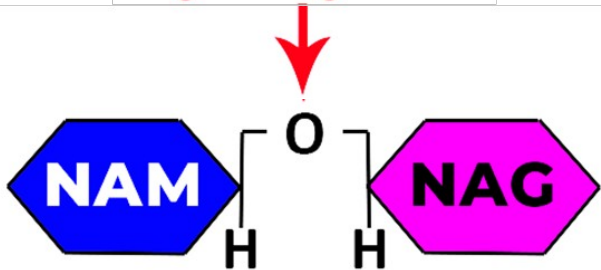


B) Chemical barriers

2) Antimicrobial peptides



Lysozyme



I) Mechanical & Chemical barriers

B) Chemical barriers

Kill microbes (cidal)

2) Antimicrobial peptides

Lysosymes

In tears, nasal secretions & saliva

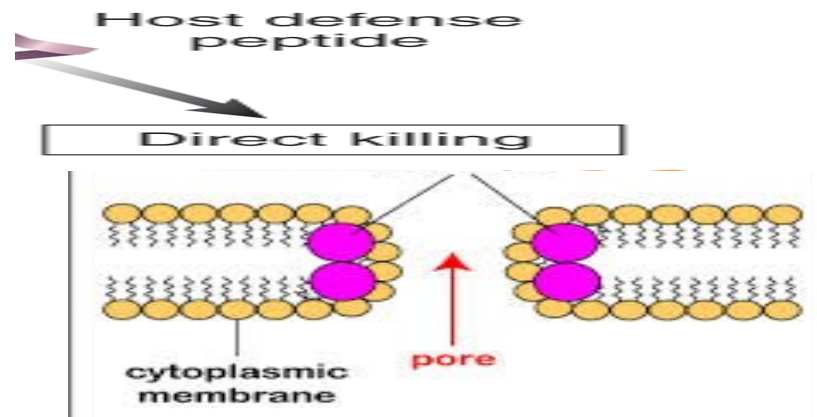
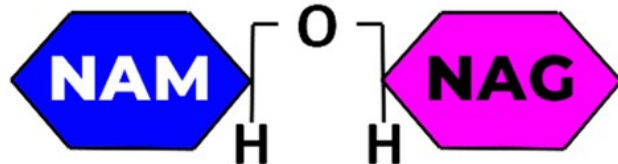


Degrade peptidoglycan
in bacterial cell wall

Defensins

- Toxic to microbes
(create pores in microbial membranes)

Lysozyme

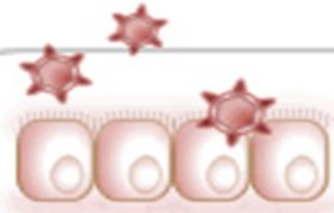


Components & Reactions of Innate Immunity

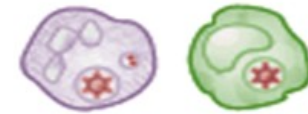
Mechanical & Chemical barriers

Normal Microbial flora

Innate Immunity



Mechanical & Chemical barriers



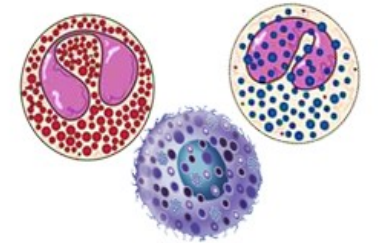
Phagocytes



Effector proteins



Flora



Inflammatory cells in allergy



NK cells

Hours

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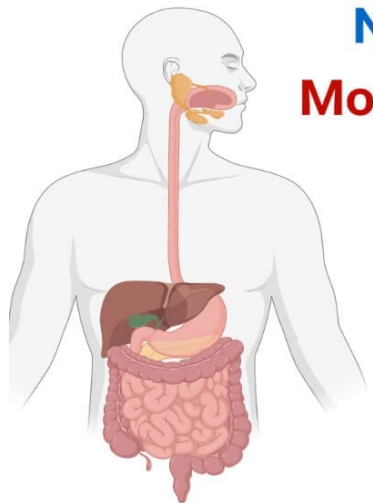
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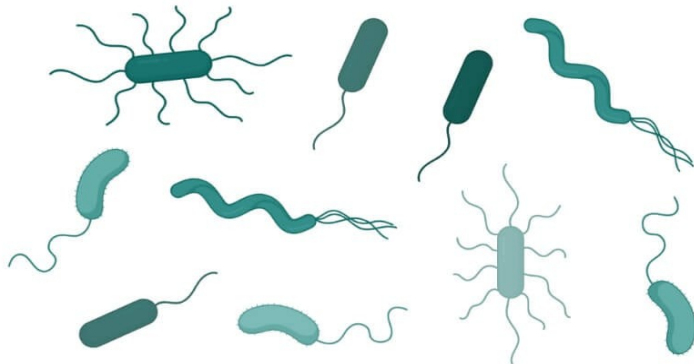
Pathogenic bacteria

ممرضة

NORMAL FLORA



**Normal Flora (Microbiota) of
Mouth and Gastrointestinal Tract**



II) Normal Microbial Flora

Cover epithelial surfaces

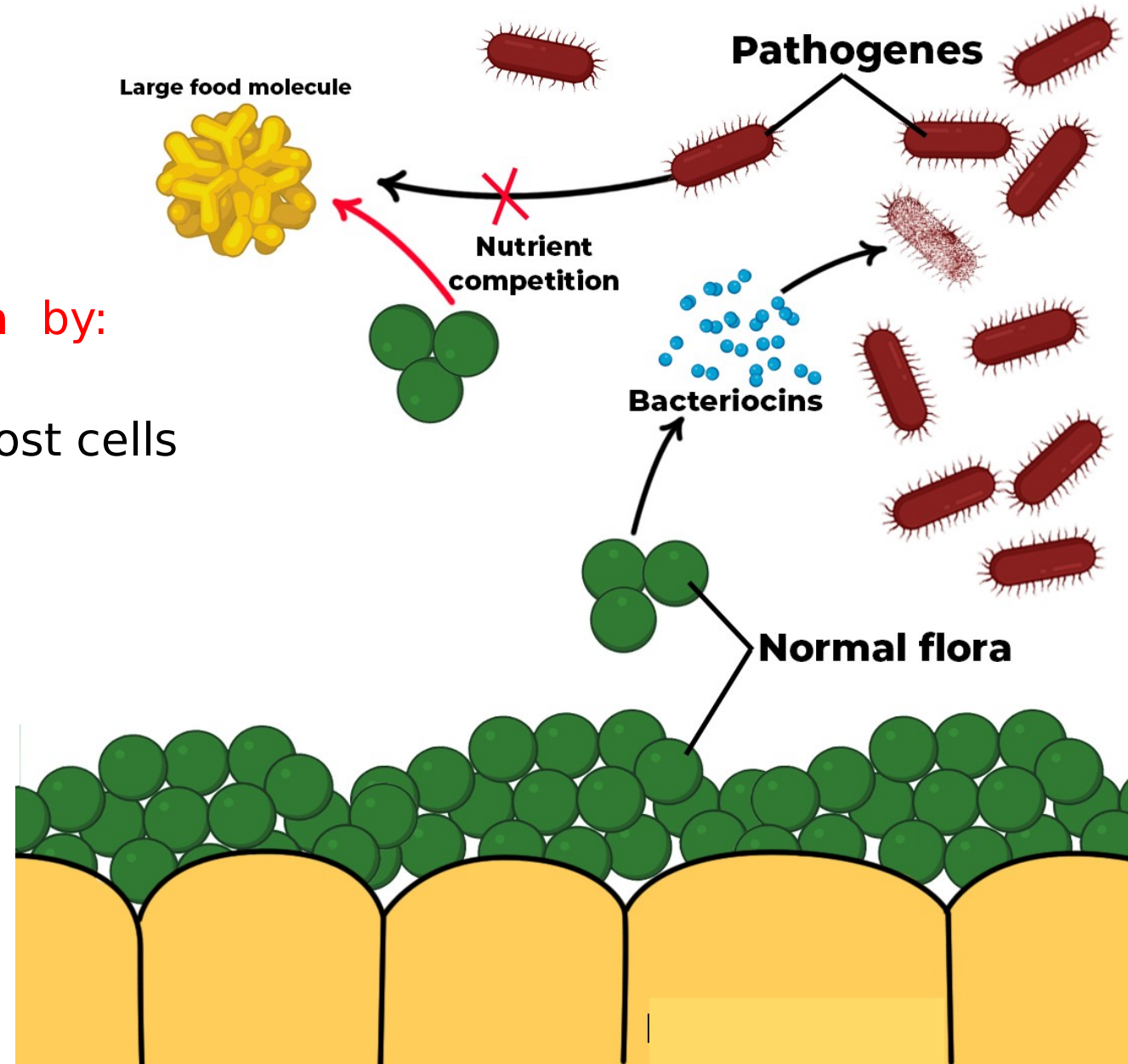


Inhibit growth of pathogenic bacteria by:

- 1) Competition for **attachment sites** on host cells
- 2) Competition for **nutrients**
- 3) Production of **bacteriocins**

(Products that kill other bacteria)

ANB



Components & Reactions of Innate Immunity

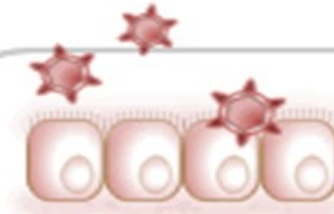
Mechanical & Chemical barriers

Normal Microbial flora

سمك الداء عنب

Inflammation

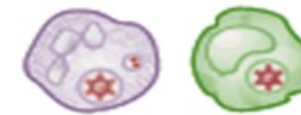
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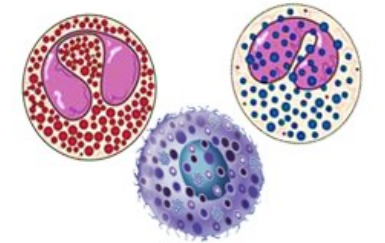
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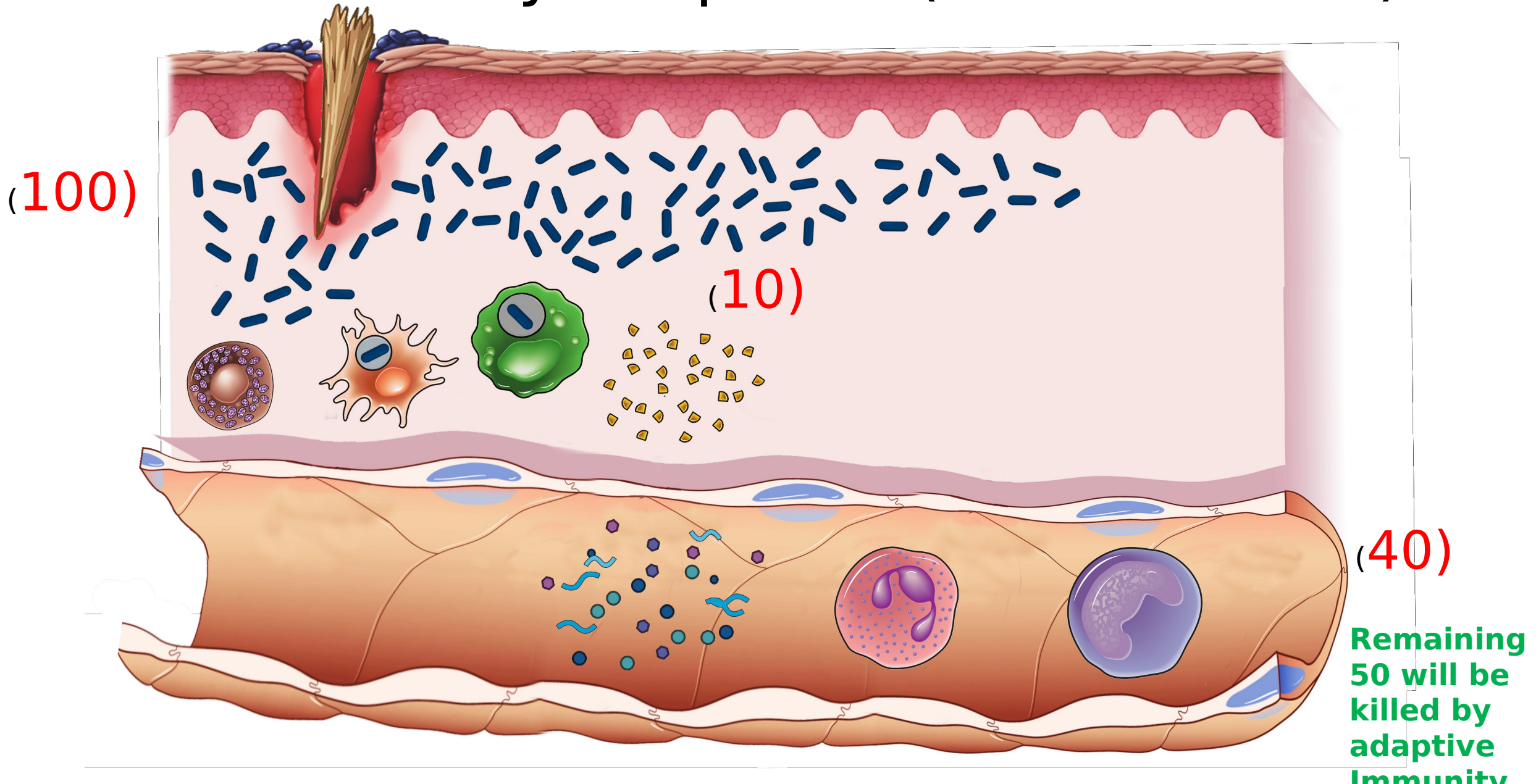
What are the myeloid cells resident in tissues ?

Residing in tissues	Mast cells	-
		Macrophages - Dendritic cells

What are the myeloid cells in blood ?

Myeloid cells		
Circulating In blood	• Neutrophils • Eosinophils • Basophils	Monocytes
	Cells of innate immunity	

Inflammatory Response (Inflammation)



Inflammatory Response (Inflammation)

Definition

Is a tissue reaction that concentrates circulating cells & effector proteins to the site of infection

Mechanism

Vasodilation (VD)



↑ capillary permeability



Migration of WBCs & leakage of effector proteins
from capillaries into infected tissues

